6. The dilation of the subclavian is circumscribed, is distal to the point of constriction, and strikingly resembles the dilation which we have produced experimentally.

7. The dilation of the artery proximal to an arterio-venous fistula and distal to a partially occluding band may prove to be referable to the same cause.

8. When the lumen of the aorta is considerably constricted the systolic pressure may be permanently so lowered and the diastolic pressure so increased that the pulse pressure may be diminished by one-half.

9. The experimentally produced dilations and the aneurysms of the subclavian artery in cases of cervical rib are probably not due to vasomotor paralysis, trauma, or sudden variations in blood pressure.

10. The abnormal, whirlpool-like play of the blood in the relatively dead pocket just below the site of the constriction, and the lowered pulse pressure may be the chief factors concerned in the production of the dilation.

11. Bands, rolled ever so tightly, do not rupture the intima.

12. Intimal surfaces, brought, however gently, in contact by bands or ligatures do not, in our experience, unite by first intention, for the force necessary to occlude thc artery is sufficient to cause necrosis of the arterial wall.

13. The death of the arterial wall having been brought about by the pressure of the band, a gradual substitution of the necrotic tissue takes place, the new vessels penetrating it from both ends. It is, I believe, in this manner that an artery becomes occluded, and it is thus that a fibrous cord forms within the constricting band.

[1] Luigi Porta. Delle alterazioni patologiche delle arterie per la legatura e la torsione. Milano, 1845, pp. 350, 351, plate V, figs. 3 and 5.

ON THE CORRECTION OF OPTICAL SURFACES

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In a recent number of the *Philosophical Magazine*, an interesting method for correcting optical surfaces by means of the interferometer, was developed by Mr. Twyman. While nothing in the paper indicates that the method is limited to relatively small surfaces, it would appear that such an application to mirrors and lenses of the size of modern astronomical telescopes can hardly be contemplated as this would involve interferometers of at least equal dimensions.

It was hoped that a modification of Mr. Twyman's method, with an interferometer of usual size, could nevertheless be employed for large lenses or mirrors.

It was found, however, unless the two optical paths of the interferometers were equal, which would involve the presence of a second lens equal to the one to be corrected, that the circular interference bands are extremely small and difficult to observe.

The following simple, fairly direct method, obviates all these difficulties and has given excellent results.

A silt in the focus of the mirror or lens to be tested is illuminated by light from a Nernst glower, concentrated by means of a microscope objective and a total reflection prism. The light returns immediately above the prism forming an image of the slit which is viewed through a microscope with a $\frac{1}{12}$ inch objective.

A series of screens (an adjustable double slit would be much better) with two rectangular apertures are placed in succession in front of the lens or mirror to be tested; one of the apertures being central and the other at varying distances from the center.

The resulting diffraction figure will be a series of bands parallel with the slit, and the position of the central band (achromatic in white light) will remain constant if the adjustment is right and the mirror perfect.

The error in light waves will be half the observed error in fractions of the fringe-width.

The lens or mirror is rotated through the entire circumference, at intervals of 45 degrees or less, and the same operation repeated; and the results plotted on the corresponding chart, which gives accordingly the error in light-waves at every selected point of the surface.

This process applied to a 5-inch achromatic lens showed errors so small that artificial errors were introduced by placing in the path of the pencil a plane parallel plate which had been made roughly cylindrical by retouching locally.

The errors were then measured as described, and amounted to about seven-tenths of a light wave at the greatest. The corrector plate was again retouched by local polishing, and after a half dozen trials (time occupied being about six hours) the errors were reduced to the order of one- or two-hundredths of a light-wave; and the resulting image (which was badly astigmatic) was rendered practically perfect.

It is clear that such a process may be applied to even the largest astronomical mirrors or lenses, both in the original figuring and in the final correction; further, this final correction may be made upon the auxiliary plate, thus incurring no danger to the objective.

With evident modification the method applies to the correction of prisms and gratings. In the latter, however, since the light must be nearly homogeneous, there may not be sufficient intensity to observe the interference fringes under the high magnification required.

It may therefore be of advantage to apply the interferometer (replacing one of the mirrors by the grating) or even more simply, by observing the interference of the light reflected from a plane surface with that diffracted from the grating.

In either case, when the adjustment is perfect, the fringes are concentric circles—which remain constant when the eye or the observing telescope is moved about in any direction, if the grating is perfect; and if not, measurement of the diameters of the circles gives the error.

If, however, the difference of path in the interferometer is small, a curious singularity is presented. The interference fringes are no longer circles but complicated forms expressible by the formula:

$$\Delta = (y - y_0)\ (x^2 + y^2) + \alpha x + \beta y.$$

Further details will appear in a coming number of the *Astrophysical Journal.*